Attachments

Cost / Benefit Analysis: Updating the Michigan Uniform Energy Code by Adopting Chapter 11 of the International Residential Code (as Amended) for New Residential Building Construction in Michigan – December 2004

A	Assumptions used in the analysis.
B-1	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Southeast Michigan Area (Pontiac – first-time home, prescriptive and performance examples).
B-2	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Southeast Michigan Area (Hadley – standard home, prescriptive and performance examples).
C-1	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Greater Lansing Area (Owosso - first-time home, prescriptive and performance examples).
C-2	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Greater Lansing Area (Williamston - standard home, prescriptive and performance examples).
D-1	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Greater Grand Rapids Area (Grand Rapids - first-time home, prescriptive and performance examples).
D-2	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Greater Grand Rapids Area (Hesperia - standard home, prescriptive and performance examples).
E-1	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Traverse City Area (Traverse City - first-time home, prescriptive and performance examples).
E-2	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Traverse City Area (Traverse City - standard home, prescriptive and performance examples standard home).
F-1	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Marquette Area (Marquette - first-time home, prescriptive and performance examples first-time home).
F-2	HERS Improvement Analysis Reports and Energy Office worksheets for home examples from the Marquette Area (Marquette – standard home, prescriptive and performance examples first-time home).
G	Building Component Table from the current MUEC.
H	Building Component Table from the revised MUEC [Chapter 11 of the IRC as amended]

Attachment A – Assumptions Used in the Analysis

1. Perspective of a typical first-time homebuyer.

   The perspective of a first-time homebuyer was taken into account by having half the analyses done on a smaller sized house using assumptions reasonable for a first-time homebuyer, i.e. 10% down payment and 15% tax rate for federal income tax.

2. Benefits & costs over a seven-year time period.

   The cost/benefit analysis worksheets indicate that the ***costs*** included down payment amount proportionate to the cost of improvements, mortgage costs representing the costs of improvements, increased property taxes proportionate to the costs of improvements, and increased home insurance costs proportionate to the costs of improvement.

   The cost/benefit analysis worksheets indicate that the ***benefits*** included yearly energy savings, tax savings as a result of improvement dollars spent, and tax savings as a result of interest paid on the energy improvement investment.

3. Fuel price increases that do not exceed the assumed general rate of inflation.

   With consultation with Michigan Public Service Commission staff, two reports were utilized to reference a reasonable consumer price index figure of **2.4%** annually. The reports used were "Global Insight U.S. Executive Summary" and "Value Line Investment Survey".

4. The buyer of the home qualifying to purchase the home before the addition of the energy efficient standards would still qualify to purchase the same home after the additional cost of the energy-saving construction features.

   Because most mortgages span over a period of time, typically 30 years, the costs of the energy efficiency improvements can also be addressed over a period of time. One mortgage mechanism that indicates homebuyers are qualified to purchase energy efficient homes is the Energy Efficient Mortgage (EEM). An EEM makes it easier for borrowers to qualify for loans to purchase homes with specific energy-efficiency improvements. Lenders can offer conventional EEMs, FHA-insured EEMs (or VA EEMs), ENERGY STAR Mortgages, or loans that combine the features of these different mortgages. Conventional EEMs can be offered by lenders who sell their loans to Fannie Mae and Freddie Mac. Conventional EEMs increase the purchasing power of the borrower by allowing the lender to increase the maximum principal, interest, taxes and insurance (PITI) amount by a dollar amount equal to the estimated energy savings. Loan officers are required to submit a HERS report or an Energy Addendum (Form 1004A or

Form 70A) to verify the expected energy savings. Michigan homebuyers can explore EEM options and identify mortgage companies that offer EEMs by visiting the Michigan Energy Office website.

5. Costs of principal, interest, taxes, insurance, and utilities.

   A. Principal & Interest: Mortgage companies were consulted to provide the average mortgage interest rate of **6.5%**. For the first time home examples, an average down payment figure of **10%** was used. Various loan programs offer a range of 0% to 3% down payment for low-income homebuyers. The Harvard University Joint Center for Housing Studies suggested that a reasonable average down payment figure for first time homebuyers was 10%, which is the figure we used for this analysis. For the medium sized home example, an average down payment of **22.9%** was used. Data from the Federal Housing Finance Board determined this figure. A mortgage calculator was utilized to compute principal and interest costs for a typical 30-year mortgage.

   B. Taxes: **Property taxes paid** were considered proportionate to the costs of energy-saving construction features. Property tax millage rates were obtained from the Michigan Dept. of Treasury Property Tax Estimator. **Tax savings** on federal income taxes were also considered (tax deductions associated with the costs of energy-saving construction features, i.e. property taxes and mortgage interest payments). IRS tax tables were used to determine a tax rate of **15%** for a first-time homebuyer and a tax rate of **25%** for a more typical homebuyer.

   C. Insurance: A Michigan insurance agency was consulted to provide sample insurance rate figures. An average annual rate increase of **$3.30 per $1,000** value was utilized for this analysis.

   D. Utilities: The Home Energy Raters utilized the current utility rates for their region. Assumption #3 in this Attachment describes fuel price increases that do not exceed the assumed general rate of inflation.

6. Considerations for meeting compliance of the revised MUEC by incorporating performance measures.

   The "mortgage costs related to energy efficiency & other costs" listed in the table on page 5 of the report does not include fees associated with Home Energy Ratings. *(Home Energy Ratings represent one mechanism that could be used to document performance compliance as indicated in section N1101.2.1, and N1105.1 of the revised MUEC.)* The following points describe how performance measures can be met by little or no cost to the homebuyer.

- Builders can document the newly constructed home as meeting *"the requirement of the International Energy Conservation Code for detached 1- and 2-family dwellings"* by using RES*check*™ software, available on-line and at no cost.

- As specified in section N1101.2.1, numbers 3. & 4. of the revised MUEC, the services of a certified Home Energy Rater are available to meet *"the design, constructions and certification requirements under the U.S. EPA ENERGY STAR® Homes Program"*, and to meet *"the design and construction requirements in conformance with the national Home Rating System (HERS) guidelines with a score of 83 or better. A certificate indicating the score prepared by an accredited agency shall be filed with the code official"*.

- There is an approximate $350.00 fee associated with the HERS service, however, there are numerous ways to pay the HERS service fee that may or may not affect the seven-year cost recovery time period. The HERS service fee could be paid by the finance institution, therefore not adding additional costs to the buyer. The HERS service fee could be paid by the builder, therefore not adding additional costs to the buyer. The cost of the HERS service fee may be included in the final price for the home, indicating that the $350.00 would be spread over the 30 year mortgage period. Even if the HERS service fee was paid in advance by the homeowner, most of the worksheets in this cost benefit analysis report indicate that the inclusion of this fee would still show a net benefit to the homeowner over the initial seven year period.